

## Description

### A METHOD OF PRODUCING HONEYCOMB STRUCTURE

#### Technical Field

The present invention relates to a honeycomb structure that is formed using a press with a die to make two metal plates(2, 6) which have hexagonal pegs positioned at a certain distance from each other, and these plates are joined together into a complete honeycomb structure.

#### Description of Drawings

FIG 1 is the position of hexagonal cells on the metal plate A;  
FIG 2 is the position of hexagonal cells on the metal plate B;  
FIG 3 shows position of hexagonal cells on both metal plate A and B when one plate is overlapping the other;  
FIG 4 is the metal plate A with hexagonal pegs formed by a press  
FIG 5 is the metal plate B with hexagonal pegs formed by a press  
FIG 6 is the honeycomb structured block in which metal formed plates are joined together.  
FIG 7 is showing a method of extending the total size of the core block by joining the honeycomb blocks in a zigzag manner.  
FIG 8 is showing a method of making honeycomb sandwich panel attaching non-woven fabric and face sheets on a core.

#### <Description of the numbers on drawing>

- 2. Metal plate A
- 4. Position of the hexagonal cells on metal plate A
- 6. Metal plate B
- 8. Position of the hexagonal cells on metal plate B
- 10 Metal plate A + B
- 12 Position of the hexagonal cells that are made automatically
- 14 Hexagonal peg
- 16 Hexagonal cell
- 18 Hexagonal cells that are made automatically
- 20 Honeycomb block A
- 22 Honeycomb block B

- 24 Non-woven fabric
- 26 Face sheet

### Technical Problems

Unlike the existing methods, the present invention is using a press to form a honeycomb structure out of many different types of metal plate. However, it seems it is very difficult or impossible to form a honeycomb structure with a single process using a press, because the hexagonal cells within the structure are placed right next to each other sharing the very thin cell-walls among them.

### Technical Solutions

In the present invention, a die is needed to be built for the making of hexagonal cells of the honeycomb structure. Honeycomb structure consists of many hexagonal cells lined up continuously but because the cell walls are so thin, it is nearly impossible to form the structure with a press and a single die in one step. In the present invention, however, a die is designed and the hexagonal cells on the die are placed at a certain distance from each other, as shown in FIG 1 and FIG 2, so that when the cell positions from those two FIGs are overlapping, the result is a perfect honeycomb shape as shown in FIG 3. This die and a press are used to change the shape of two thin metal plates(2, 6), shown in FIG 1 and FIG 2, into two formed metal plates which have hexagonal pegs(14) protruding out as shown in FIG 4 and FIG 5. And then, in order to make a shape of honeycomb structure, these two formed metal plates are joined together into a block, like in FIG 6, by facing the protruding sides to each other and inserting one plate's pegs (14) into the spaces among the other plate's pegs (14).

In order to have physical properties of honeycomb structure from the block described above, the hexagonal pegs (14) have to be bonded to each other strongly. So, before joining the two formed metal plates together from the previous process, some adhesives or welding materials are inserted or applied on the outer surface of the pegs (14).

FIG 7 shows the method of extending the size of the block by joining the honeycomb blocks (20, 22) in a zigzag manner

FIG 8 shows the making of a honeycomb sandwich panel. Face sheets (26) and adhesive are added to the top and bottom of the block. The face sheets can be made out of many different materials. Non-woven fabric (24) can be used with the adhesive to create a better bond between the sheets (26) and the block.

### **Advantageous Effects**

In the present invention, a press and a die are used to make the process of producing honeycomb structure simpler. Also, honeycomb structure can be formed using many different types of metal that have high tensile, compression, and bending strength.